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**Varma designed ultra modern and high efficiency turbines which can use gas, steam or fuels as feed to produce electricity or mechanical work for wide range of usages and applications in industries or at work sites.**

**Varma turbine engines can be used in all types of vehicles. These turbines can also be used in aircraft, ships, battle tanks, dredgers, mining equipment, earth moving machines etc,**

**Salient features of Varma Turbines.**

**1. Varma turbines are simple in design, easy to manufacture, easy to operate and maintain.**
**2. Varma turbines are less expensive.**
**3. Varma turbines have a great power to weight ratio, compared to present turbines.**
**4. Varma turbines will have low maintenance costs.**
**5. Varma turbines will have 95% efficiency, the highest compared to any present turbines. 90 % of turbine's inside space is empty.**
**6. Varma turbine parts will be less prone to rust, erosion, wear and tear.**
**7. Varma turbines will arrest all leakages of steam, gas and water in respective turbines.**
**8. Varma water turbines can convert the whole potential energy in every drop of water, acquired by virtue of its position, into kinetic energy and further into electricity**
**9. Varma turbines will have no blades, either fixed or rotary, the complex structures of present turbines.**
**10. Varma turbines have common design to use gas, steam or water's potential energy as feed to generate electricity or mechanical work.**
**11. Varma turbines will have low noise and no vibrations because the balance of the rotating sphere and shaft is perfect.**
**12. The base of the turbine will be more compared to its steam intake chambers. It gives more stability to turbine.**
**13. Varma turbine will face less thermal and corrosion fatigue, less stress, cracking and misalignment.**
**Basic conceptual design of Varma Turbines - There are four types of varma turbines**
**1. Varma steam turbines**
**2. Varma gas turbines**
**3. Varma water turbines**
**4. Varma Turbine engines.**

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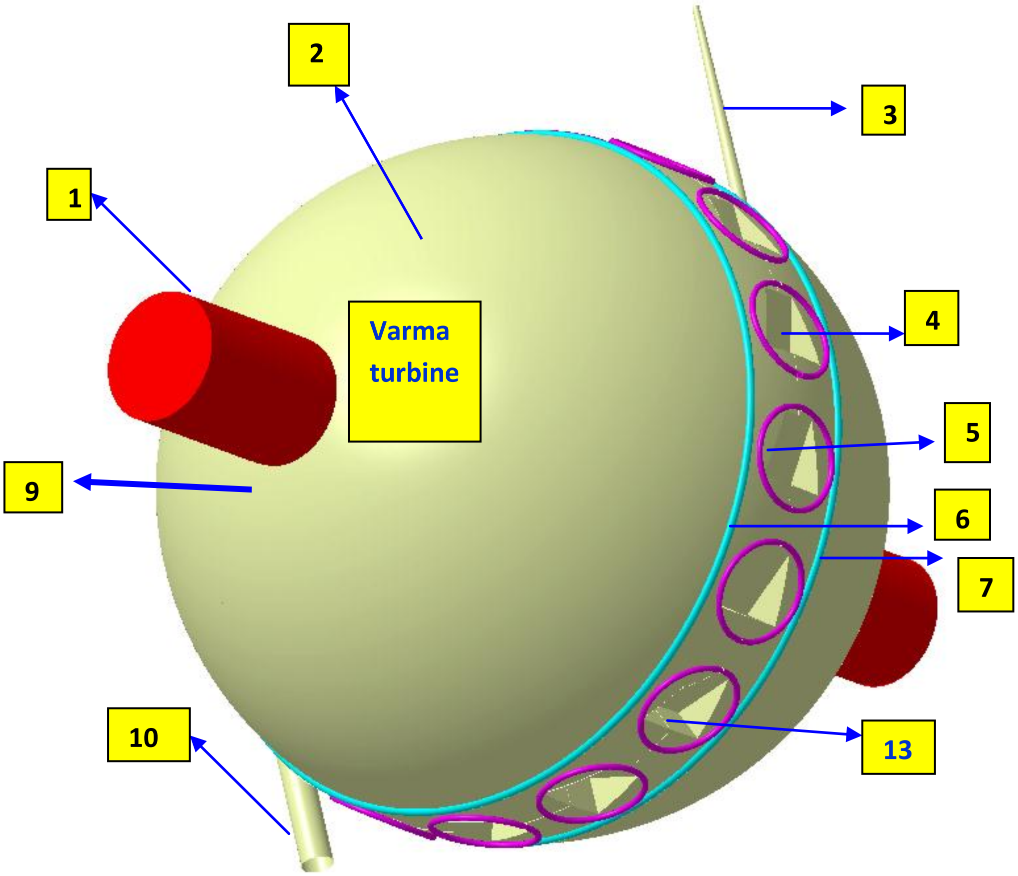
1. Varma steam turbines can be used to extract the energy of steam and convert into shaft power. These turbines can be adaptable to any kind of steam with temperatures ranging from $150^0$C to over $650^0$ C and pressures ranging from over 160 KSC to below 100 KSC.

# 1. <u>Varma Steam turbine basic design</u>

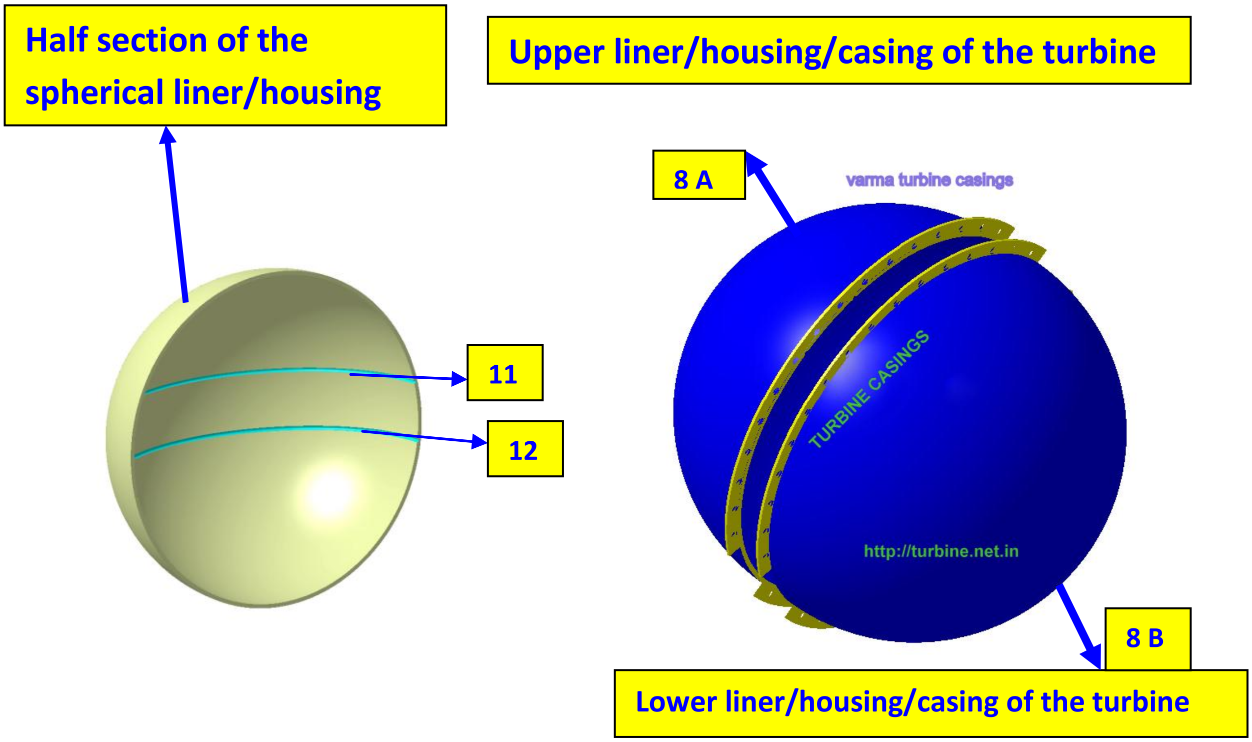
## A] Turbine sphere




## <u>VT = Varma turbine</u>



## B] Turbine casing/housing/liner




1. Turbine shaft
2. Sphere
3. Steam injector
4. Steam intake chamber. The number chambers on this turbine sphere are 16.
5. Circular tube ring round steam chamber. [Chamber rings]

6 & 7 Circular tube rings round the sphere. [Sphere rings]

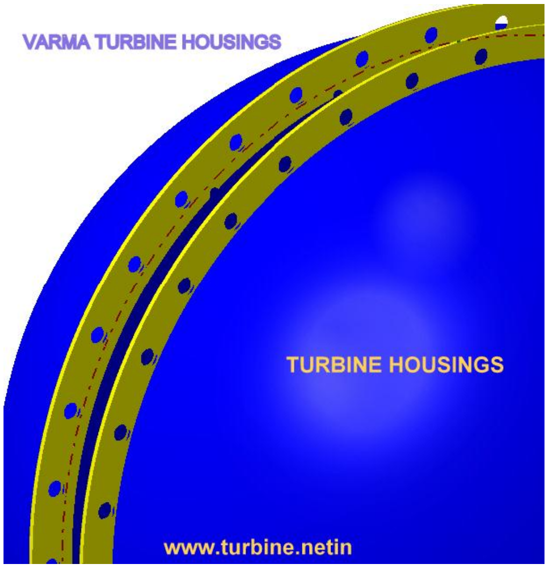
8 A & 8 B. Liner/housing/casing of the turbine

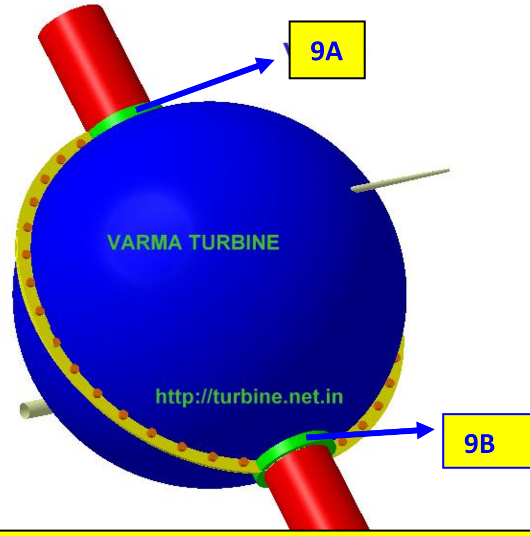
9 A & 9 B. Bearings on the shaft on either side of the sphere fixed to the outer spherical liner.

10. Steam exhaust pipe fixed to the spherical liner over the turbine sphere.

11 and 12 - Grooves inside the spherical liner/housing/casing of the turbine to hold circular tube rings which are fixed on the sphere. The two circular tube rings will move in these grooves of the liner while rotating along with sphere.

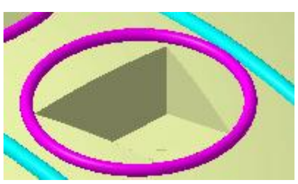
13. Wall of the steam intake chamber.


**Turbine with casing/housing/liner comprised of upper and lower parts coupled together by bolts and nuts.**

**Varma steam turbine contains sphere. This sphere will have a shaft through its centre. There will be liner/housing/casing over this sphere which is comprised of two parts, one part is upper and another part is lower. These two parts are coupled together on their edges with series of bolts and nuts. This entire casing/housing/liner is also spherical in shape fixed to shaft by means of bearings on the shaft. The outer shell of the bearings on the shaft will be fixed to the turbine liner/casing/housing and remain stationary. The inner shells of the bearings are fixed to the shaft and will rotate along with the turbine and shaft. Steam injector and exhaust pipes are attached to this outer liner/housing/casing on opposite sides.**

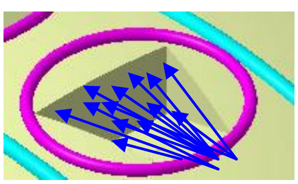


**Steam intake chamber on the turbine sphere – The top (open) and bottom surfaces of the chamber are isosceles trapezoid in shape. The depth of the chamber at one side is zero, where steam will be injected at. The rectangle shaped wall of the chamber, at the other side, will act as the full face of the blade. The two other sides are sector shaped. That means this chamber has five sides.**

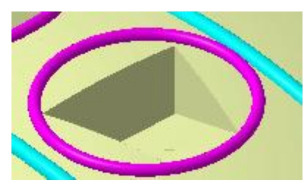
**The turbine sphere will have steam intake chambers on its outer shell. The top and bottom surfaces of the chamber are isosceles trapezoid in shape. The number of chamber on the sphere vary from 2 to 24 depending upon the size, capacity of the turbines and also on the quality and quantity of the steam the turbine receives from the boilers. These chambers will have circulars tube rings around them. There will also be two circular tube rings fixed in the grooves on the sphere parallel to each**



other on either side of these intake chambers. These circular tube rings round the steam intake chambers and the circular rings round the sphere will not allow the steam escape into the space between the sphere and spherical liner or housing or casing of the turbine. The steam intake chambers can receive the high pressure steam from steam injectors at more than $600^0$ C temperatures and at 160 Kilogram/square centimeter. This high velocity steam jet will directly hit the wall of the intake chamber causing the turbine sphere rotate and drive the output shaft. The liner/housing/casing, which made up of two sections, is joined and fixed to the axis with the support of bearings on the shaft on either side of the sphere. The liner/housing/casing of the turbine, which is fixed to the shaft, will remain stationary while turbine is rotating. The sphere will rotate along with its shaft, tubular steam rings and two circular tube rings which are fixed on its surface on either side of the chamber rings. The circular tube rings round the chambers will move horizontally and the two circular tube rings round the sphere will move vertically along with the sphere. All these tube rings will touch and glide over the inner surface of the liner/housing/casing while moving along with the sphere. The steam flow is not continuous process as in the present turbines. The steam injection will be at regular intervals into steam intake chambers as when the mouth of the chamber gets into the line of steam nozzle injector. The line of the high pressurized steam jet will be exactly perpendicular to the wall of the steam chambers. The sphere will get its rotational motion due to the heavy impulse it got on its chamber walls from high pressure steam. The velocity of the steam should be much more than the velocity of the turbine sphere. The rotational movement of the sphere will transfer the whole energy of the steam to the shaft and the power of the shaft will be converted into mechanical energy. The shaft that runs through the sphere will be coupled to stator where electricity is generated. Shaft is a power transmitting device to transmit rotational movement of the sphere to the stator.



Picture showing the stream of high speed steam or gas molecules, released from injector, hitting the wall of the chamber with full force.

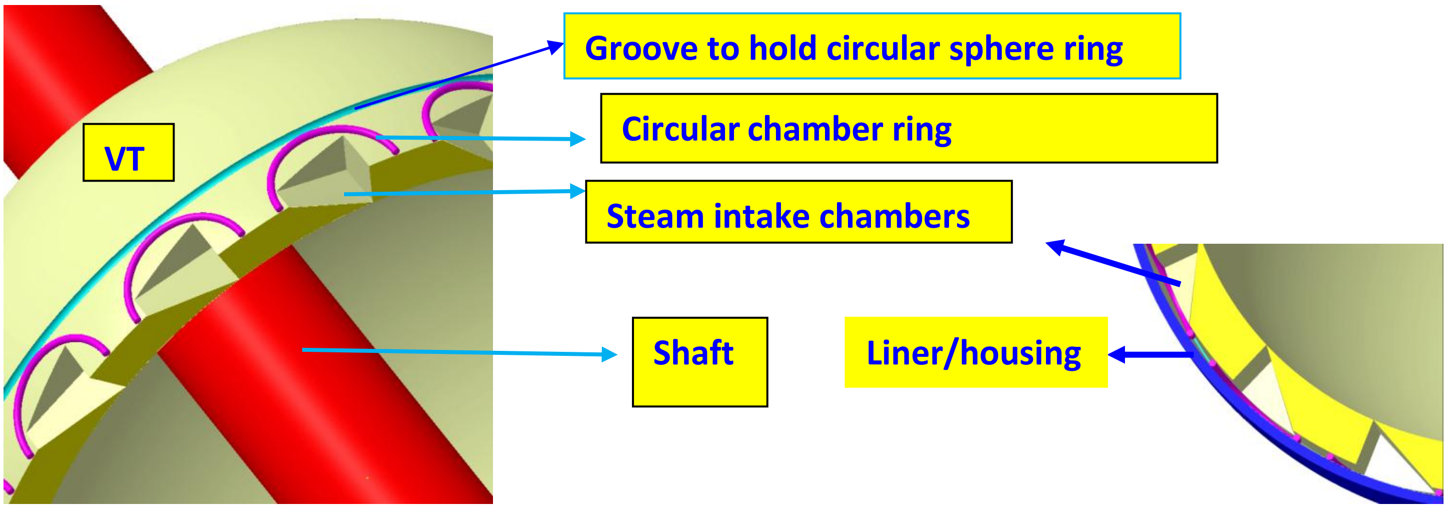


The steam will get exhausted through the vent in the outer spherical liner on the other side of the turbine. The exhaust pipe, which is fitted on the liner/housing/casing of the turbine, will be exactly opposite to the rotational movement of the turbine sphere. The leaving steam will transfer its energy to the cylinder's rotational movement. That means the turbine will get impulse energy at the wall of the steam chamber, and get the reaction energy when steam leaves out from the turbine at the exhaust opening on the liner/housing. Thus, both of the impulse energy and reaction force will help the turbine extract the maximum energy of the steam to rotate and convert it into mechanical energy through shaft. The difference between the temperature of the incoming steam

at the mouth of the chamber and the temperature of the leaving steam at the outlet corresponds to the amount of heat that was converted into mechanical power. The exhausted steam can be sent to the boiler and reheated once again to be reused in the second turbine.

The heat energy of the steam can be extracted in two stages and there will be absolutely no necessity for third stage.

Here this mage shows the steam intake chambers around turbine sphere's equator. The number of chambers will vary from 2 to 24 depending upon the size and capacity of these turbines.



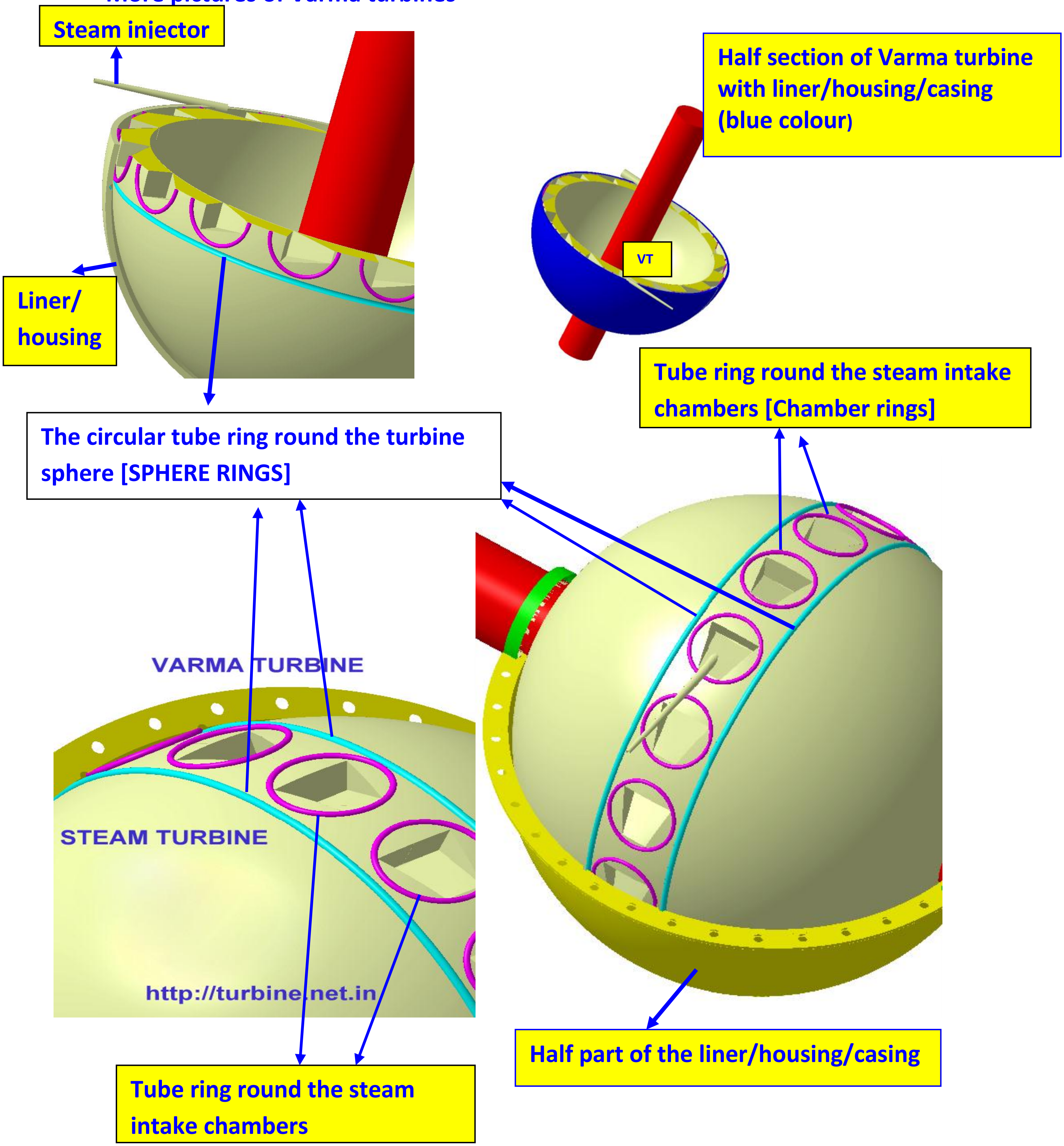

Picture one showing one of the two grooves round the turbine sphere on either side of the chamber rings. There will be two circular tube rings fixed in these grooves round the turbine sphere. These two are called sphere rings.

Picture 2 shows the quarter section of the spherical liner over the turbine sphere. This liner/housing/casing is fixed to the main shaft at its poles by means of bearings on either side. This outer spherical liner will remain stationery while the sphere moves along with its shaft. This spherical liner will act as both liner and housing/casing of the turbine.

The liner over the turbine sphere will have two grooves parallel to each other inside its surface to hold and facilitate the movement of the two circular tube rings which are fixed in the similar grooves on either side of the steam intake chambers on the turbine sphere. There is no fixed or rotary blades al all in these turbines. The walls of the steam chambers will act as the full face of the blades and take the full thrust of the steam, released by injector. The entire space inside turbine is empty. Because of these features, Varma steam turbine will have a great power – to – weight ratio compared to present steam turbines. The amount of power that gets out of Varma steam turbine compared to its weight will be very

high. Varma steam turbine will use less quantity/volume of steam, compared to present turbines, to transfer more power to the shaft.

More pictures of Varma turbines ----





**The high velocity pressurized steam, released through the nozzle by its throttle valve and governor and control valves, will exert force on the intake chamber wall and rotate the turbine sphere along with its shaft. The steam will leave this chamber in the opposite direction through the exhaust pipe on the other side of this turbine sphere. While leaving this chamber through exhaust vent on the liner/housing/casing, the steam will transfer its energy to the rotating sphere as reaction force applies.**

**The steam will be released at regular intervals through this nozzle at the mouth of each chamber so that the enormous energy of steam will propel the turbine sphere rotate along with its shaft. The flow or output of the steam will be regulated by governor's control valves. The steam released in each chamber will be escaped from the exhaust opening of the outside liner/housing/casing over the turbine sphere. The entire energy contained in the high pressure steam will be converted into kinetic energy and further into electricity by generator containing stator. In these turbines the steam will have totally rotational movement and give its entire energy in the form of both impulse and reaction forces. That means the impulse energy at the entry point and reaction energy at the exit point. The steam at the high pressure (160 kilograms/square centimeter will be pumped in to the steam chambers and it will be exited at low pressure (below 40 kilograms/square centimeter). Due to fall in pressure the energy of steam will be converted into kinetic energy and further into electricity.**

**The liner/casing/housing will have two circular grooves in its inner wall to take the two circular tube rings which are attached to the turbine sphere and parallel to each other on either side of the steam chambers. These two circulars tube rings move vertically along with the turbine sphere in the inside grooves of the liner/housing/casing. The two circular tube rings along with chamber rings will not allow steam escape into the space between the turbine sphere and the liner/housing/casing. The space between the spherical liner and turbine sphere is equal to the thickness [diameter] of the circular tube rings round the turbine sphere minus the total depth of the grooves inside the liner and on the turbine sphere. The thickness of the circular chamber rings is smaller than the two circular tube rings round the cylinder because the tube rings round the steam chambers will only touch the inner surface of the liner/hosing/casing and closely glide along the inner surface while moving horizontally along with the turbine sphere. The two bearings on either side of the spherical cylinder will keep the spherical liner stationery while the turbine sphere rotates along with the shaft. The steam will be released at regular intervals through nozzle injector at the mouth of each chamber so that the enormous energy of steam will propel the turbine sphere rotate along with its shaft. The steam released in each chamber will be escaped from the exhaust valve fitted to the spherical liner over the turbine sphere.**

# ULTRA SUPER CRITICAL STEAM TURBINE

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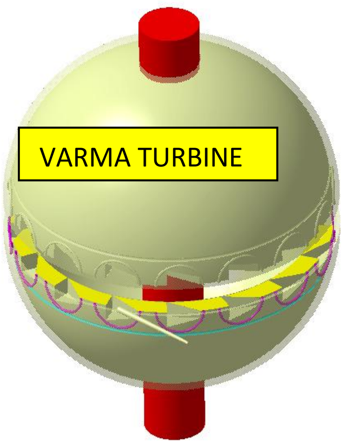
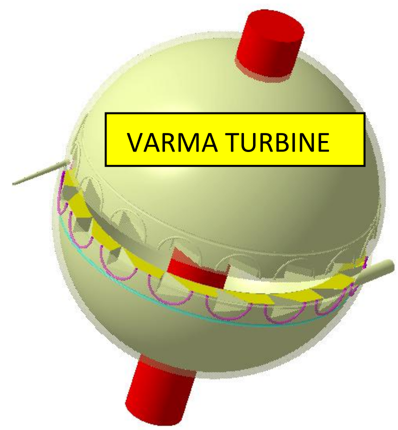
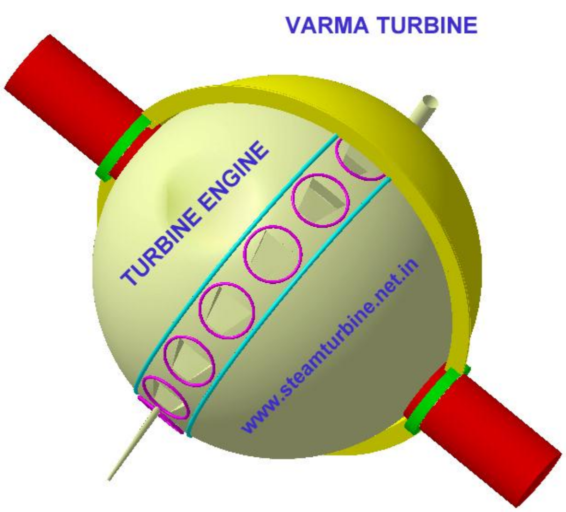
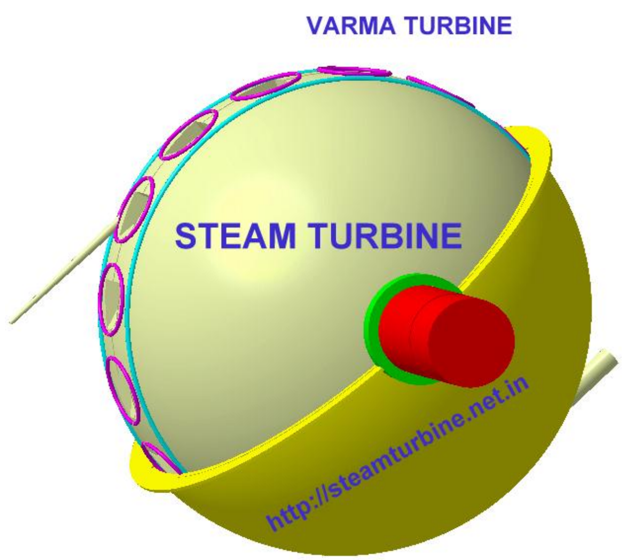
**The movement of the highly concentrated steam molecules released from the injector nozzle will travel at high speeds and hit the wall of the steam chamber to give the turbine sphere a rotational movement. Continuous pounding on each wall of the chambers of the rotating sphere cylinder will drive the shaft connected to the generator on one side and compressor on the other side. There will be absolutely no impediment to the movement of turbine sphere in Varma turbines because only a small fraction of surface area of chamber rings and two rings round the sphere will contact with the liner or housing of the turbine. The energy loss due to friction is almost zero.**




**TURBINE IMAGES WITH HALF SECTION OF LINERS/HOUSINGS/CASINGS**

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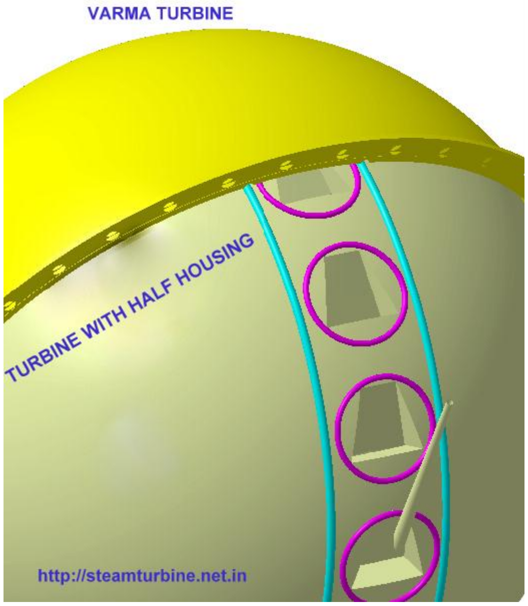
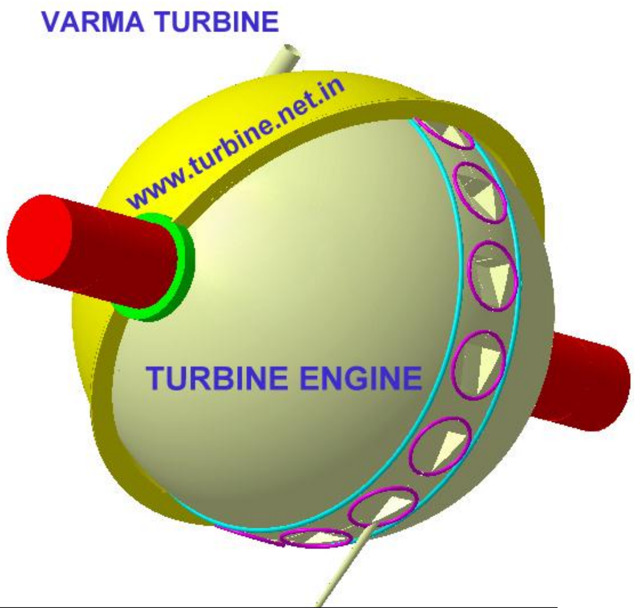
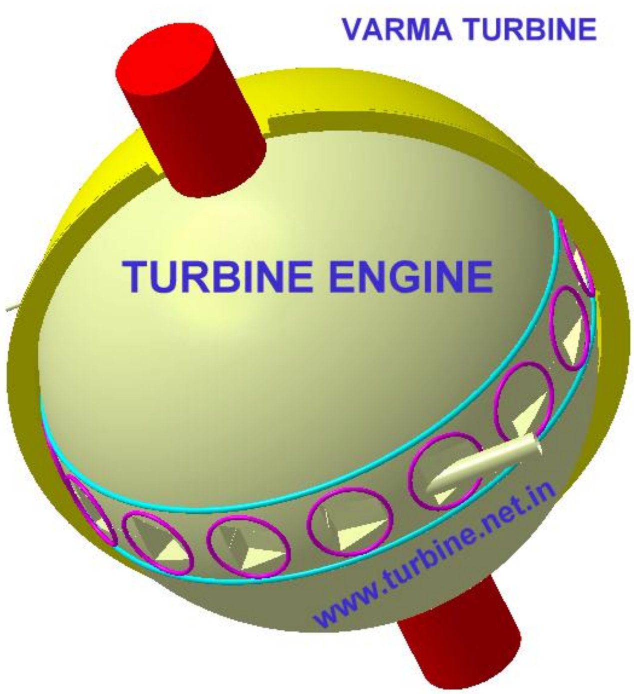



**TURBINE IMAGES WITH HALF SECTION OF LINERS/HOUSINGS/CASINGS**





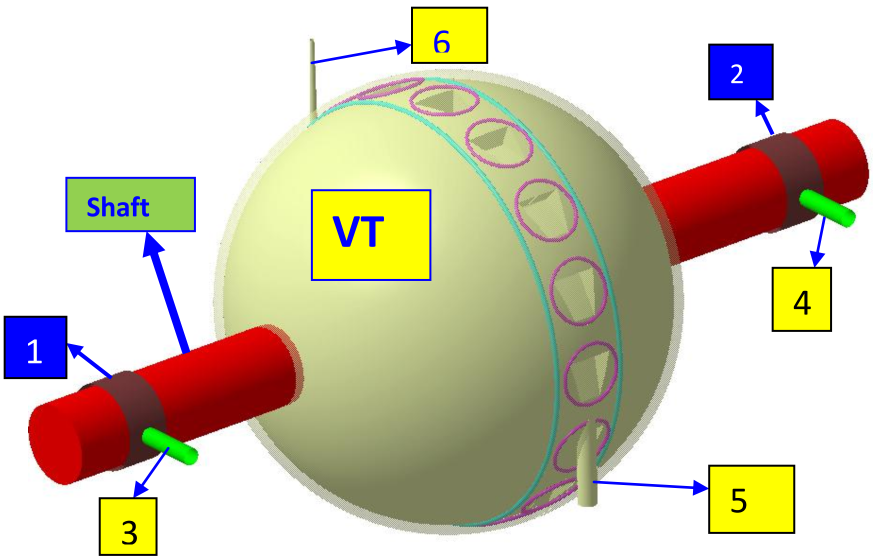
**Turbine with full casing/housing/liner**

## 2. VARMA TURBINES – CONDENSING TYPE

**Chilled water cooled turbines**

**Varma turbines will have condensing system within the turbine itself.**

**Picture showing transparent Varma turbine (Outside liner/housing is not visible in this picture).**



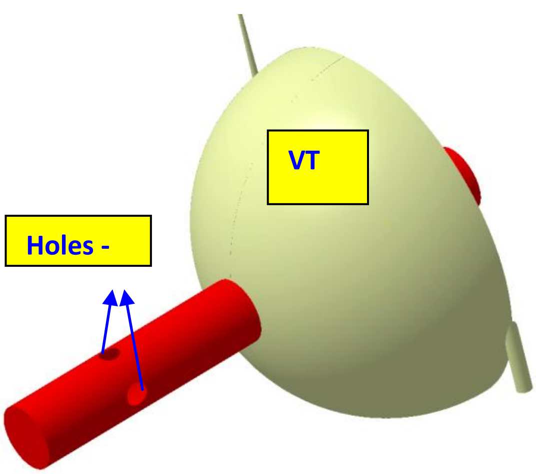

**1 and 2 – housing on the shaft**

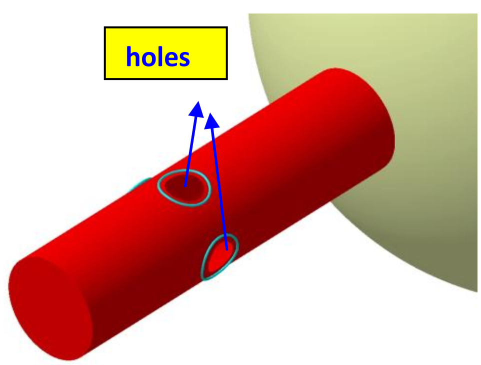
**3. Inlet water pipe attached to the housing on the shaft**

**4. Outlet water pipe attached to the housing on the shaft**

**5. Exhaust pipe**

**6. Steam nozzle injector**



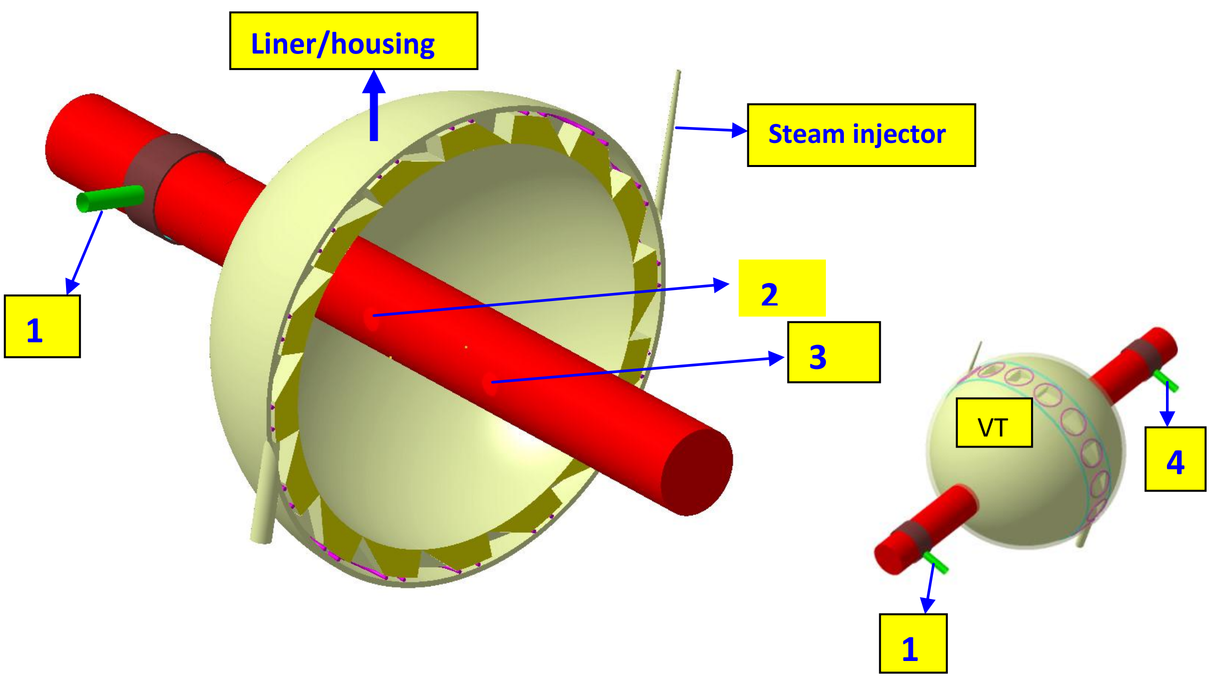




**On one side of the shaft there is housing with bearings inside attached to the shaft. The shaft along with the turbine sphere will rotate while the housing with water pipe will remain stationary. There will be holes in the shaft to let chilled water flowing from the pipe into the**



**water duct that runs inside the shaft and into the sphere. Inside the hollow turbine sphere there is a hole through which water comes from the duct and fills the entire space inside the turbine sphere. There is another hole on the shaft inside the turbine sphere. The water will enter through this hole and pass through the water duct that runs inside the shaft, and flows out of the turbine sphere. There are holes on the shaft outside the turbine. Over these holes there is housing on the shaft. The water will pass through the hole on the housing and through the pipe attached to the housing on the shaft. Water that flows through the turbine sphere takes heat of the turbine and it will go to the boiler where it will be converted into steam. The huge difference of the temperature and pressure of the steam at the inlet and at exit (outlet) of the turbine corresponds to the heat which is converted into mechanical energy and further into electricity. The energy from the fuels (coal, gas or other fuels) is used in the boiler to convert water into steam and turbine will transfer the energy of the steam into mechanical work by subjugating the steam.**

**The turbine sphere along with its shaft will rotate with its stomach full of chilled water which is constantly flowing. The continuous flow of water inside the sphere turbine will keep the turbine cool. The high temperature steam that entered the turbine chamber will lose much of its heat when it exits from the exhaust vent on the spherical liner after travelling half perimeter distance along with the turbine sphere.**

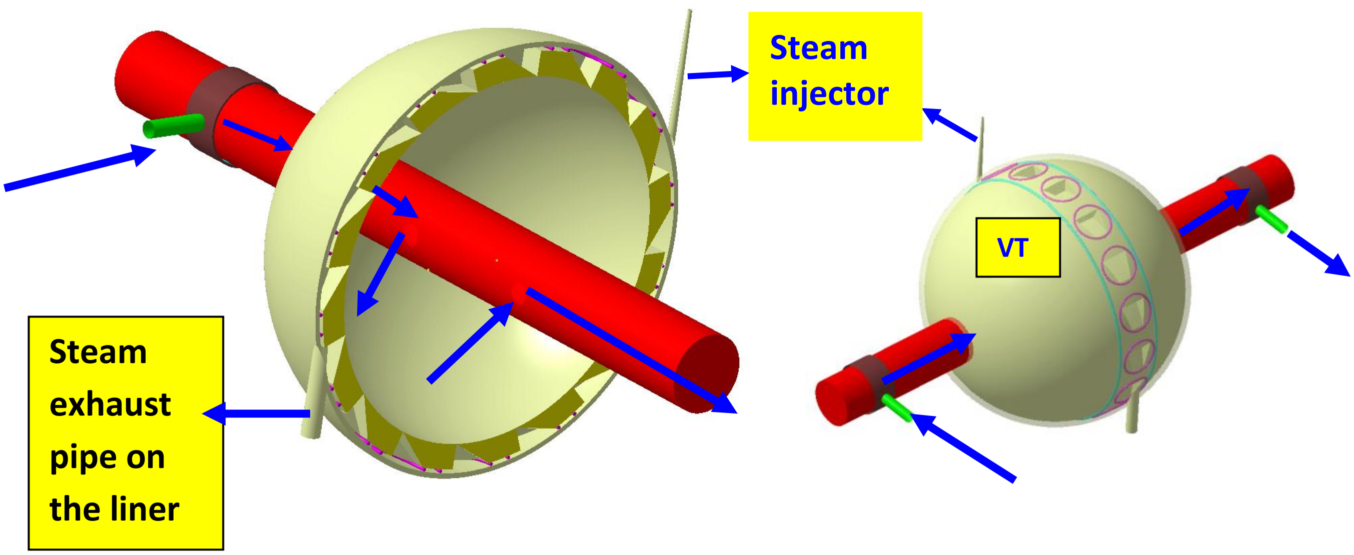



**1. The inlet pipe attached to the housing in the shaft through which water enters into the shaft. Inside the shaft there is water duct that runs through the shaft which passes through the turbine.**

**2. The hole on the shaft through which water comes out through the duct and fills the entire area inside turbine sphere.**

**3. After filling the entire inside area of the sphere turbine the water escapes through this hole goes out of the turbine sphere through the duct that runs inside the shaft**
**4. Water comes out of the turbine through this outlet pipe attached to the housing on the shaft on the other side of the turbine sphere.**

**<u>Picture showing the flow of water</u>**




**When these turbines are used in vehicle the water coolant or air can be circulated side the turbine sphere.**

## 3. VARMA GAS TURBINES

### Varma gas turbine designs are almost same as that of Varma steam turbine

**In Varma gas turbines compressor is attached to the shaft on one side and generator (armature and stator) is coupled to the other side of the shaft to produce electricity.**
**Some of the power generated by the turbine sphere is used to drive the compressor which compresses gas and air. The burning of this highly compressed pressurized gas combined with air in the combustion chamber outside the turbine sphere will expand the air and the high velocity and volume of hot gas will be injected into the sphere chamber by nozzle injector which is connected to a governor. The nozzle injector is fixed to the liner/housing/casing, which covers the turbine sphere.**

The high velocity of the expanded hot gas stream will hit the wall of the turbine chamber and spins the turbine at high velocity. This hot air will travel the distance of half perimeter length along with the sphere turbine to escape through the vent on the spherical liner which is exactly on the opposite side to the steam injector. The hot air will be exhausted through the exhaust pipe fixed on the liner in the opposite direction to the movement of the sphere. The leaving hot gases will transfer its energy to the turbine as result of reaction force. The turbine will rotate because of both impulse and reaction forces created by high temperature hot air. The turbine sphere will rotate because of the impulse force of direct pounding of the high velocity hot gases on the walls of the steam chambers as well as the guiding force on the walls of the chamber and the chamber rings. If gas turbine is used in the power plants the other end of the shaft will be coupled to the generator containing stator to produce electricity.

The shaft power can be used to create mechanical work for wide range of usages and applications in industries and at work sites. These turbines can be used in aircraft, ships, battle tanks, earth moving machines, mining equipments, dredgers and all types of heavy vehicles. There will be absolutely no impediment to the movement of turbine sphere in Varma turbines because only a small fraction of surface area of chamber rings and two tube rings round the sphere will contact with the inner surface of the liner/housing of the turbine. Hence the energy loss due to friction is almost zero.

<u>4. Varma turbine engines</u>. Turbine engines can be used with any type of fuel i. e; LNG, petrol, diesel or kerosene. These turbine engines can be used in all types of vehicles.

The present internal combustion engines have fuel efficiency of less than 50%. In these engines most of the energy in the fuels is being lost in the form of heat. Here the movement of the piston in the liner up and down. The velocity of piston is different at different points in the liner. In each cycle of the linear movement, the velocity of the piston at TDC and at the bottom is zero. Huge variations in the velocity of the piston movement is decreasing the fuel efficiency of these engines

But in Varma turbine engines, the movement of the turbine sphere is rotational and continuous which gives fuel efficiency of more than



**90%. Varma turbine engines can have either water cooling or air cooling system with same design.**
**The fuel efficiency difference in present engines and Varma turbine engines can be better explained in this way.**

**1. A ———————— B**

50 meters track - internal combustion engine

**2. A ——————————————————————————————— B**

800 meters track – Varma turbine

**If is an athlete is asked to run 800 meters on 50 meter track his initial speed is zero at point A and he gets maximum speed at middle point of the track and his speed is zero at point B. He once again starts at zero speed at B and reaches A where his speed is zero. This way he has to do 8 to and fro movements to cover the distance of 800 meters.**
**If the same athlete is asked to run 800 meters on the 800 meters track he starts at point A with zero velocity but he will run with same velocity till he covers 800 meters at point B. The time he takes on 50 meter track will be 4 times more than the time he takes on 800 meters track. That means he has to consume more calories and time on 50 meter track.**

**Varma turbines will meet the ever growing energy demands of the world with better usage of fuels.**

**In India 50 crore tonnes of farm waste is being burnt every year in the open fields. 10 crore tones of methane gas, generated from the cattle dung, is being wasted into the open air every year.**
**In addition to this 10 crore tonnes of urban waste (generated from vegetables, plastic, pvc, carry bags, bottles etc.,) is also being wasted every year.**

**Varma turbines can produce 16,000 megawatts of power if this farm waste is utilized by establishing 1 mw mini power plants for each cluster of 3 to 4 villages.**

**If we assume that each Kg of farm waste contains 10 mega joules of energy, then 5,00,000 crore mega joules of energy is being wasted in open fields in India every year.**

**If 1 MJ is equal to 0.28 kw-hr, then 3.57 kgs of farm waste will produce 1000 kw/hr electricity.**
**Total**

**500000000000 kgs/3.57=140056022408 kw/year divided by 365 (days) = 383715129 kw/day divided by 24 (hours) = 15988130 kw/hr divided by 1000 = 15,988.130 mw/hr**

**The total capacity of power that can be achieved by using farm and other organic waste = 15,988 mw/hr**
**20,000 mini power plants of 1 mw/**
**hr capacity (3 to 4 villages) should be established throughout India to utilize farm, organic and urban waste to meet the growing energy demands of India.**
**If average consumption of electricity is 200 units (1unti =1000watts) per month then 1 mw power plant can supply electricity to approximately 3,600 households in rural India.**
**The advantages of mini power plants**

1. **The transmission loss will be less.**
2. **No fuel cost.**
3. **Transport cost of farm, organic urban waste is low.**
4. **Pollution is less because they are scattered all over the country.**
5. **The ash that is generated in the boilers can be broadcast in the field to achieve higher yields per acre.**

**If we assume that the total thermodynamic efficiency of boiler and turbines is 70%, then the actual electricity that can be produced from 70 crore tonnes of farm, organic, urban and methane = 19000 mw/hr.**



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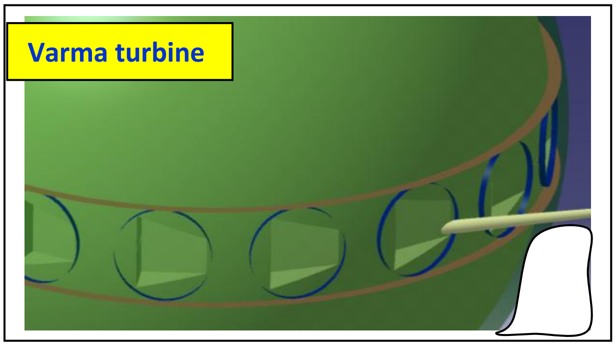
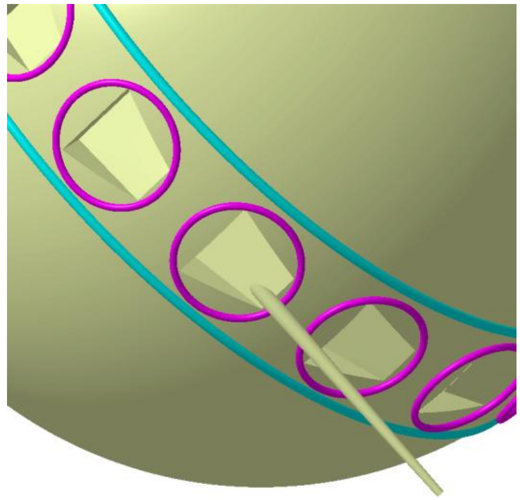
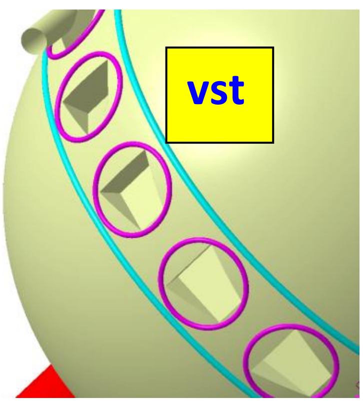
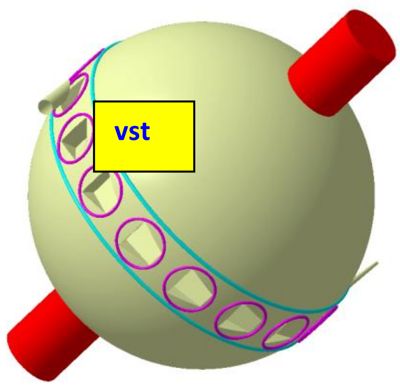
# Varma turbine sphere images without its liner or housing

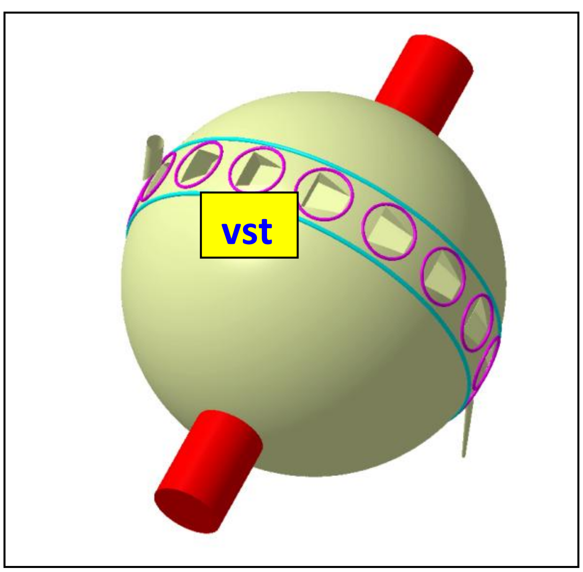


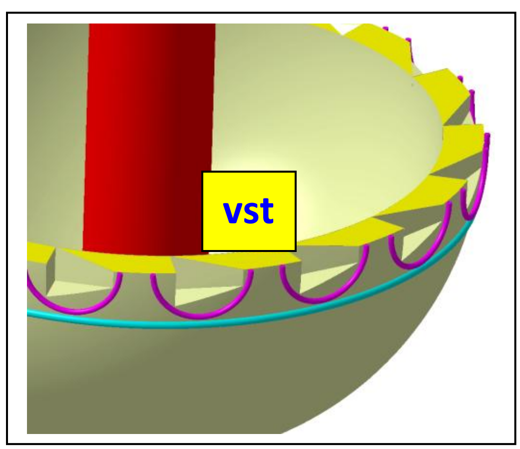



**VARMA TURBINE PICTURES WITHOUT LINER/HOUSING**

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**An example of Varma turbine's basic measurements out of hundreds of various sizes and capacities**

## Varma turbine measurements – 1

**All figures in units**

1. Diameter = 2000
2. Radius = 1000
3. Perimeter = 6285.714
4. Total Space for each chamber = 392.857
5. Chamber ring outer diameter = 352

5a. Chamber surface (curvature) Diameter outside = 391.131

6. Chamber ring inner diameter = 340

6a. Chamber inner surface (curvature)
Diameter length = 377.797

7. Chamber width –1 = 210
8. Chamber width --2 = 90
9. Chamber length = 190

9a. Chamber length from the depth point to head point=210.237

10. Chamber depth at width- 1 = 110
11. Chamber depth at width -2 = 0
12. Chamber ring tube diameter = 12
13. Chamber ring radius =6
14. Groove depth on the sphere round the chamber= 4
15. Width of the groove = 12
16. Perimeter of the ring= 1087.428

Thickness of the chamber = 150

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17. Diameter of the circular tube ring round the sphere = 16
18. Radius of the circular tube ring round the sphere = 8



19. Depth of the groove on the sphere = 4

20. The surface (curvature) distance between the perimeter and the outer surface of the circular ring = 212

21. Average surface (curvature) distance from the perimeter to the centre of the ring = (196+212)/2 = 204

21a.The tangent distance from perimeter to the centre of the ring = 183.590

22. Perimeter of the sphere = 6285.714

23. Quarter perimeter of the sphere = 1571.428

24. There fore  Perimeter of the circular ring round the sphere  = 5469.712

26. Diameter of spherical liner = 2000 + 16.1 =2016.1

27. Radius of the spherical liner = 1008.05

28. Depth of the groove inside the liner = 4

29. Width of the groove inside the liner and on sphere= 16

30.  Thickness of the spherical liner = >15

31. Depth of the groove inside the spherical liner = 4

32. The surface (curvature) distance between the perimeter and the inner surface of the ring = 204

33. Perimeter of the liner inside = 6336.314

34. Quarter perimeter of the liner = 1584.078

35. Perimeter of the groove inside the liner = 5520.312

36. The gap between the sphere and the spherical liner = 8.

37. The gap between the two grooves from centre to centre inside the liner = 408

38. Nozzle diameter at chamber head = 10 to 80

39. Nozzle diameter at the other end = 5 to 40





## For commercial usage of these designs and franchise for manufacture of VARMA turbines and Varma engines, contact

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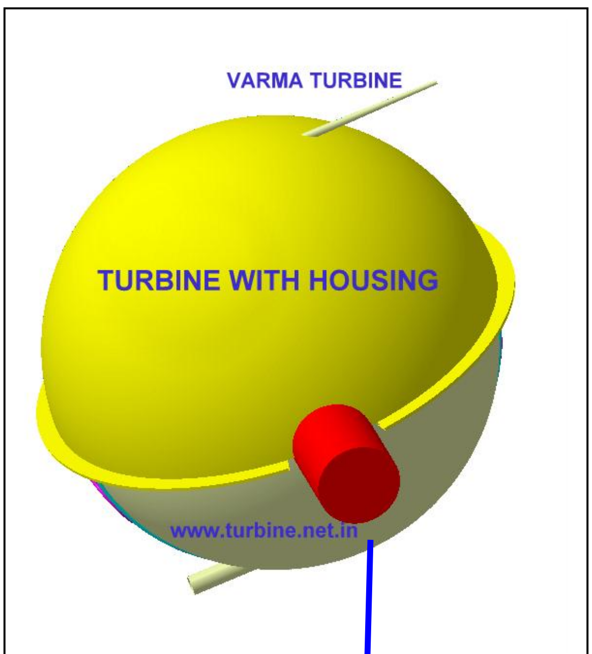
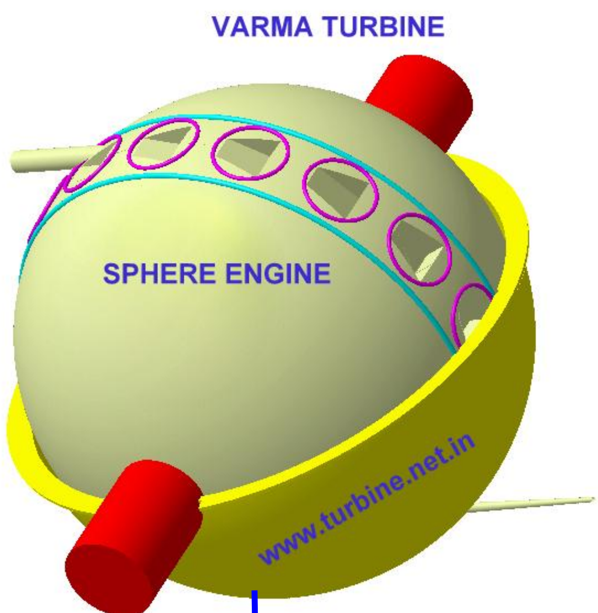
**http://www.turbine.net.in**
**www.steamturbine.net.in**

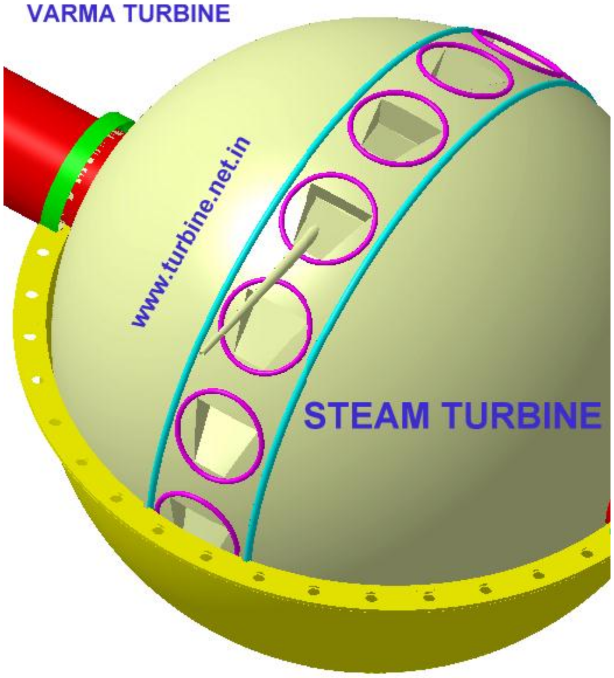


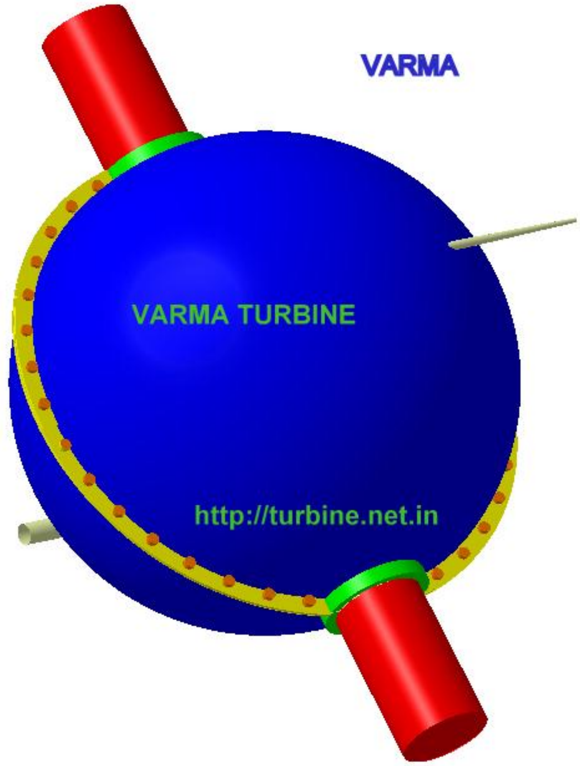




**VARMA TURBINE WITH FULL CASING/LINER/HOUSING**

**VARMA TURBINE WITH HALF CASING/LINER/HOUSING**






**VARMA TURBINE WITH HALF CASING/LINER/HOUSING**

**VARMA TURBINE WITH FULL CASING/LINER/HOUSING**

## Varma's other research works

## 1. Tax reforms

**All Direct and Indirect taxes accompanied by tax laws, accounting, auditing and tax returns, can be abolished if a new tax system called "TOP Tax system" is adopted and implemented by all nations. Ultimate economic reforms will relieve 7 billion people of the world from the cobweb of ambiguous and complex tax structures, plethora of tax laws, mandatory and cumbersome accounting, auditing, tax returns and consequent quagmire of all tax related cases. http://taxationreforms.com**